

University of Oklahoma
Homer L. Dodge
Department of Physics and Astronomy

Graduate Student Handbook

**Policies and Procedures for the pursuit of a graduate degree in
Physics, Astrophysics, or Engineering Physics**

Revised Fall 2024

TABLE OF CONTENTS

	PAGE
TABLE OF CONTENTS.....	3.
PREFACE	5
WEBSITE AND CONTACT INFORMATION	6
I. APPLICATION AND ADMISSION.....	7
A. Standard Admission.....	7
B. Conditional Admission	7
C. Admission as a Special Student.....	7
II. GENERAL INFORMATION FOR ALL GRADUATE STUDENTS.....	9
A. Advising and Initial Financial Support.....	9
B. Graduate Credit	9
C. Grades and Grade Point Averages	10
D. Enrollment Limitations.....	10
E. Annual Review of Progress	11
F. Dismissal of Graduate Students.....	11
G. Transfer Credit.....	12
H. Departmental Colloquia, Journal Clubs, and Seminars	12

I. Teaching Practicum	12
J. Introduction to Research/Teaching Workshop.....	13
III. MASTER'S DEGREE PROGRAMS	14
A. MS in Physics	14
B. MS in Physics with Emphasis in Astronomy	15
C. MS in Engineering Physics	16
D. Master's Thesis.....	16
E. Master of Natural Science Program	17
IV. DOCTORAL PROGRAMS.....	18
A. Physics PhD Course and Hour Requirements.....	18
B. Physics Qualifying Exam.....	19
C. Special Oral Qualifier	22
D. Astrophysics PhD Course and Hour Requirements.....	23
E. Astrophysics Qualifying Exams.....	24
F. Advisory Conference.....	25
G. Doctoral Committee	26
H. Annual Evaluation of Doctoral Students	27
I. General Examination	27
J. Doctoral Dissertation.....	29
K. Final Examination	30
L. Engineering Physics PhD.....	31
V. FINANCIAL SUPPORT.....	32

A. Teaching and Research Assistantships	32
B. Financial Support Policy.....	34
C. Stipend Increases	35
D. Graduate College Fee Waiver Program	36
E. Student Health Plan	36
VI. DODGE PHYSICS COMPLEX	37
A. Nielsen Hall and Lin Hall.....	37
B. Building and Lab Access, Study Areas, Keys.....	37
C. General Safety Procedures	37
D. Student Shop	38
E. Computing	38
VII. APPENDICES	39
B - Quick guide to steps in the Physics, Astrophysics, and Engineering Physics PhD programs	43
C - Suggested sequence for courses for the Physics PhD.....	44
D - Suggested sequences for courses for the Astrophysics PhD	47
E - Schedule of Advanced Topics Courses in Physics and Astrophysics.....	48
F - English Proficiency Exams	49

PREFACE

This handbook is maintained by the Graduate Studies Committee (GSC) to guide graduate students in the Homer L Dodge Department of Physics and Astronomy at the University of Oklahoma through the various degree programs offered. The fundamental mission of the Homer L Dodge Department of Physics and Astronomy is to train talented scientists, and in the process produce important research in fundamental and applied physics and astronomy. The policies and procedures presented below are presented with that goal in mind.

This handbook focuses on the policies specific to the Department of Physics and Astronomy. Students are strongly encouraged to become familiar with the University of Oklahoma Graduate College resources and regulations:

Graduate College Bulletin: <https://www.ou.edu/gradcollege/forms-and-policies/graduate-college-bulletin>. This bulletin includes information and policies regarding all aspects of the graduate programs at the University of Oklahoma. The departmental graduate programs follow all these rules.

Graduate College Forms: <https://www.ou.edu/gradcollege/forms-and-policies/forms>. Most of the paperwork for completing graduate degrees is completed through the online dynamic forms available on this page.

New Graduate Welcome Portal: <https://gograd.ou.edu/apply/status>. This is a central portal designed to help new students get started at the University of Oklahoma.

Graduate College Website: <https://www.ou.edu/gradcollege> provides a wide range of resources for support of graduate students. Visit the “Student Life” materials.

Keep in mind that the rules and guidelines below are at the discretion of the full faculty of the Department of Physics and Astronomy and are subject to change by the faculty.

The Graduate Studies Committee has tried to prepare this information in as clear and readable a form as possible. We appreciate any questions or suggestions.

WEBSITE AND CONTACT INFORMATION

<https://www.ou.edu/cas/physics-astronomy>

The Homer L Dodge Department of Physics and Astronomy maintains a website featuring information on departmental research and research highlights, the colloquium schedule, schedules of seminars and journal clubs, and a directory of members of the department. Information on the department's graduate programs is online at:

<https://www.ou.edu/cas/physics-astronomy/students/graduate>.

I. APPLICATION AND ADMISSION

There are several different admission methods for the Department of Physics and Astronomy. Most students will apply and be admitted using the standard admission process. There are also options for conditional admission and non-degree admission. In addition, there are some special considerations for international students who are not native speakers of English. (See Sec. V-A.)

A. Standard Admission

<https://www.ou.edu/cas/physics-astronomy/students/graduate/apply>

Most students apply and are admitted to the doctoral program in Physics or Astrophysics through the University of Oklahoma Graduate College. In some cases, a student may apply and be admitted to the terminal Master's program. Doctoral students typically get a non-thesis Master's degree as they progress toward their PhD as described in Section III of this document and do not need to apply separately for the Master's degree.

B. Conditional Admission

Some students may be admitted to the Graduate College *conditionally*. These are usually either students with an undergraduate GPA between 2.5 and 3.0 or students who have significant gaps in their undergraduate physics education. Their admission letter will specify the conditions of their admission (e.g. passing specific courses they did not have as an undergraduate). Conditional students must meet the conditions of

their admission to remain in the program, although they may petition the faculty for additional time if there are circumstances that have impacted their studies.

C. Non-Degree Admission:

An Unclassified Status is appropriate for any person eligible for admission to the Graduate College who wishes to take graduate courses but does not plan to pursue a graduate degree. Graduate Visitor Status is appropriate for students in good academic standing at another regionally accredited institution.

Work completed as an Unclassified student can be applied toward a graduate degree under the same criteria as Transfer credit. Enrollment as an Unclassified student is limited to 12 hours. Unclassified students are not eligible for admission to a graduate program during the same semester but may apply to the Graduate College for future semesters.

II. GENERAL INFORMATION FOR ALL GRADUATE STUDENTS

A. *Advising and Financial Support:*

Graduate studies are fundamentally different from undergraduate studies: A graduate program is essentially one of preparation for a profession, much like law or medical school. The transition from student to scientist may, at times, be demanding. The department is committed to supporting, encouraging, and helping all students succeed throughout their graduate program. Initially, incoming students will be advised by the Graduate Studies Committee. During their first year, students will meet the faculty members in the research area(s) of interest to them to find an initial advisor. When the student becomes a PhD candidate, the chair of their Doctoral Committee will be their research and academic advisor. The Engineering Physics Graduate Liaison or a person designated by the Liaison advises students in the Engineering Physics Program. Students are generally supported financially as Graduate Teaching Assistants (GTA) during their first year. In subsequent years, the department will make a dedicated effort to support all students financially as requested by the students' faculty advisor.

B. Graduate Credit:

Graduate credit is given for courses listed as 5000 and 6000 level classes or undergraduate courses designated as available for graduate credit. Whether a particular course is acceptable for credit toward a degree is determined by the Physics and Astronomy Department, the student's Advisory Committee, and by the Dean of the Graduate College. It is Graduate College policy that no 3000 level courses from the department will be accepted for graduate degrees in Physics and Astronomy. Advanced undergraduate courses in Mathematics, Engineering or related fields, as indicated with a "G" before the course number in the OU Course Catalog (<https://ou-public.courseleaf.com/courses/>) or in OU's "Class Navigator", (<https://classnav.ou.edu>), may be taken with the consent of a student's Advisory Committee. A maximum of 12 credit hours of 4000 level courses with graduate credit from the department can be taken for a graduate degree.

C. Grades and Graduate College Standards:

The academic standards of the Graduate College are described in the Graduate College Bulletin (<https://www.ou.edu/gradcollege/forms-and-policies/graduate-college-bulletin#6>). Students making regular and timely progress in their classes, exams, and research meet the college standards and remain in good academic standing. There are, however, several conditions that can result in academic probation or dismissal:

- Course grades of C, D, F, U, I, or N. In graduate school, grades of C and below are not passing grades. The Graduate College reviews and sends academic notice for students receiving one of these grades. The department reviews the student progress in these cases.
- A semester GPA below 3.0. A student with a GPE below 3.0 for one term will receive an academic warning. The student will return to good academic standing by earning a GPA of 3.0 or higher in the next term.
- Multiple semesters with a GPA below 3.0. A student with a GPA below 3.0 in two out of three sequential terms will have an enrollment stop. For the student to continue, the departmental Graduate Liaison will need to submit a retention plan to the Graduate College, in consultation with the student

and advisor, outlining the criteria needed for the student to make satisfactory progress. The Dean of the Graduate College may approve or disapprove this plan.

- Unsatisfactory grade or evaluation on research. A student receiving a grade of U on dissertation research or on their annual evaluation for two consecutive terms will receive an enrollment stop. The departmental Graduate Liaison must submit a retention plan to the Graduate College.
- Not fulfilling retention plan. A student not meeting the requirements of a retention plan, as described above, will be dismissed from the graduate program.
- 9 Hours of C, D, and/or F. A student who has accumulated 9 hours of C, D, and/or F will be dismissed from the graduate program.

A student receiving a grade of C or below in any class may retake the class. Only the second grade will count toward the student's GPA. A student may retake up to 4 courses, not to exceed 18 hours. Courses that are retaken do not replace the maximum allowed 9 hours of C, D, or F grades.

D. Enrollment Expectations:

Students who are supported by the department as a standard 0.5 FTE GTA or Graduate Research Assistant (GRA) must meet the Graduate College criterion for full-time enrollment of 5 hours during each Fall and Spring semester. It is not necessary for students on a GTA or GRA to enroll in the summer unless the student is planning to obtain a degree in that semester (see below). International students with a 0.5 FTE assistantship must also complete 5 credit hours each Fall and Spring semester but should also check with International Student Services (<https://www.ou.edu/cis/iss>) before making any changes to their enrollment.

Students during the first three semesters are expected to enroll in 9 credit hours in the Fall and Spring semesters to expedite progress towards the degree, if possible. A student's research or GSC advisor will help guide them through the best path toward their degree in cases where 9 credit hours may not be appropriate.

All students who have enrolled in research hours (PhD research 6980) are required to maintain a continuous minimum enrollment of 2 hours of research each Fall and Spring semester until the dissertation defense is held. Summer enrollment is not required unless the student plans to defend during the summer semester.

Enrollment is limited to 16 hours per semester (9 per summer) unless additional hours are requested by the student's advisor and approved by the Graduate Dean. Students with a half-time (0.5 FTE) teaching or research assistantship may not take more than 12 hours per semester (6 per summer).

E. Annual Review of Progress:

All students will have an annual review of progress toward their degree. This typically occurs in the Spring semester. For first-year students, this evaluation is conducted by one or more members of the GSC. A student with a research advisor will be evaluated by their advisor. A student with an Advisory Committee (see below), which typically becomes the student's Doctoral Committee, will be evaluated by their advisor and their committee. The purpose of the evaluation is to ensure the student's steady progress toward graduation and to help with any problems that may have arisen since the previous review. The student's advisor will complete the annual evaluation form in collaboration with the student and committee for submission to the GSC. The GSC will review the evaluations and address any issues identified.

F. Dismissal of Graduate Students:

Under exceptional circumstances, the department may dismiss a student from the graduate program for reasons beyond those listed above. Grounds for dismissal include (but are not limited to): failure to adhere to ethical codes of scholarship; failure to make timely progress toward the degree including obtaining a thesis/dissertation advisor and organizing an appropriate Advisory Committee; failure to successfully fulfill assigned teaching duties; or failure to maintain minimum acceptable standards in coursework, the Qualifying Exam, or research.

Graduate students may appeal faculty and departmental decisions on issues related to both academics and assistantships. Information about academic integrity and

appeals is available in the Graduate College Bulletin

(<https://www.ou.edu/gradcollege/forms-and-policies/graduate-college-bulletin#6.3>).

G. Transfer Credit:

Credit from another graduate school, or undergraduate credit in some cases, can be transferred to a degree program in the Physics and Astronomy department. Rules are available in the Graduate Student Bulletin:

Master's Program: (<https://www.ou.edu/gradcollege/forms-and-policies/graduate-college-bulletin#7.1.3>)

- Credit must be approved by the department and Graduate College.
- Transfer credit cannot have been used for a completed bachelor's, master's, or doctoral degree.
- Transfer credit and resident undergraduate credit cannot be more than 12 hours.
- Transfer credit is listed on the Master's Degree Program of Study for approval (see below).

Doctoral Program: (<https://www.ou.edu/gradcollege/forms-and-policies/graduate-college-bulletin#8.2.3>)

- Credit must be approved by the department and Graduate College.
- Transfer credit cannot have been used for a completed bachelor's or doctoral degree. It may have been used for a completed Master's degree.
- Transfer credit and resident undergraduate credit cannot be more than 49% of the credit required for the PhD (44 hours).
- Transfer credit must be approved at the PhD Advisory Conference and listed on the Advisory Conference Report (ACR, see below) for approval. Students wishing to transfer graduate credit are encouraged to discuss this with the GSC chair.

H. Departmental Colloquia, Journal Clubs, and Seminars:

The department colloquia are an important part of the graduate education program. They provide all members of the department with the opportunity to hear from researchers in a variety of fields from other parts of the nation and the world. This exposure is important for the development of broad appreciation of physics and astronomy. In addition, each research group (Astrophysics, High-Energy Physics, Condensed Matter, and Atomic/Molecular/Optical Physics) has one or more journal club(s) or seminars that meet on a regular basis. Students working in those fields are strongly encouraged to regularly attend and actively participate. *Students are expected to attend the departmental colloquia, seminars, and related activities with the encouragement of their advisor.*

I. Teaching Expectations:

Teaching is a vital aspect of the mission of the Homer L. Dodge Department of Physics and Astronomy, and an important aspect of the department's graduate program. The communication and presentation skills gained with experience teaching can be important for the future of our graduates, whether they pursue an academic career or some other career path. GTAs will be supervised by the instructor of record of the course they are teaching, usually a faculty member. Faculty should be available to help GTAs improve their teaching skills and to help resolve any student questions or concerns that arise. Faculty members should also discuss any concerns regarding GTAs that arise with the Graduate Studies Committee. The GSC will also review the GTAs' Course Reflection Surveys each semester to determine if

Most new graduate students in the department will be supported as a Graduate Teaching Assistant during their first year or two in the program. Teaching duties include running discussion sections for the introductory courses, teaching introductory physics and astronomy labs, helping teach some of the undergraduate majors' courses, and grading for all levels of classes. All new GTAs must take the New GTA Orientation (<https://www.ou.edu/gradcollege/cost-and-aid/graduate-assistantship#new-gta-orientation>) after they are accepted to the program. The orientation consists of both an online portion to be completed before the start of the semester and an in-person portion

to be completed during the first week of the semester. The orientation covers the expectations and policies for instruction at the University of Oklahoma.

New international graduate students are also required to be certified to teach at the University of Oklahoma. The English Training & Certification Services office (ETCS, <https://www.ou.edu/gradcollege/student-life/etcs>) is responsible for this certification and also provides free training options for those taking or re-taking the certification test. International students should arrange a time to take the certification test before the start of the semester when they are assigned a GTA. All GTAs are expected to be certified at either Level A or Level B, what is needed to teach a discussion or lab. Those who do not meet these levels on their first attempt should take advantage of the ETCS training and re-take the certification test the following semester. The department covers the cost of all certification attempts. Students who are not Level A or B certified can receive a GTA and be assigned as graders. However, if they have not obtained certification by the start of their second year in the program, students will have a lower priority for teaching assignments that might jeopardize their support on a teaching assistantship.

For students needing support over the summer, there are a limited number of teaching assistantships available for summer courses. Teaching duties for summer classes are generally divided between two GTAs. Summer classes are also an opportunity for those interested in gaining experience teaching to be responsible for running an entire course. This could be beneficial when applying for future jobs.

J. Introduction to Graduate Studies Workshop:

All first-year graduate students to our program are required to participate in a course entitled *"Introduction to Graduate Studies."* This Fall semester workshop/seminar includes both exposure to the research being conducted in the department (through evening Faculty Research Seminars), discussion of ethical and practical issues of being a physics/astronomy graduate student, career directions, and discussions on best teaching practices and student interaction. These workshops also introduce students to a range of resources and services provided by the department, Graduate College, and University.

III. MASTER'S DEGREE PROGRAMS

The department offers Master of Science degrees in Physics, Physics with Emphasis in Astrophysics, and Engineering Physics. The master's degree may be completed in one of three ways: completing a research project and writing and defending a thesis; passing the PhD General Exam, including both the written and oral parts; or by passing the departmental physics qualifying exams.

The Graduate College Bulletin gives the general requirements for completing the master's degree (<https://www.ou.edu/gradcollege/forms-and-policies/graduate-college-bulletin#7>), and the official Physics Master's Degree Check Sheet (<https://ou-public.courseleaf.com/dodge-arts-sciences/dodge-physics-astronomy/physics-master-science/>). The departmental degree checklists give step-by-step details for both Thesis and Non-Thesis options (Appendix A). To obtain the degree, the appropriate checklist must be completed and signed by the students' advisor and submitted to the chair of the GSC. Details regarding the required courses and credit hours follow.

Graduate students planning to complete their master's degree should be aware of the Graduate College deadlines. The Program of Study should be submitted the semester before the planned graduation date, the application for graduation should be completed in the first two weeks of the semester of the planned graduation, and the thesis defense and/or advisory committee meeting before the last week of the semester.

A: MS in Physics or Engineering Physics (Non-Thesis Options):

A Non-Thesis Physics Master's degree is usually obtained by graduate students as part of their work towards a PhD, although this is also an option for a terminal master's degree. There are two paths to obtain a non-thesis master's degree, either passing the three departmental PhD Qualifying Exams at the master's level or above (see Section IV-B) or completing the PhD General Exam (see Section IV-D) and completing the required paperwork.

The requirements for a Physics Non-Thesis master's degree are:

- A total of 32 Graduate-level credit hours consisting of

- 20 hours of Physics and/or Astronomy courses at the 4000 level and above, with all 4000 level courses approved for graduate credit (not including Phys 5980),
- 12 hours of other graduate coursework as approved by the advisory committee,
- Completion of the General Exam or Physics Qualifying Exams.

The requirements for an Engineering Physics Non-Thesis master's degree are:

- A total of 32 Graduate-level credit hours consisting of
- 12 hours of Physics courses approved for graduate credit (not including Phys 5980),
- 12 hours of Engineering courses approved for graduate credit,
- 8 hours of elective courses approved for graduate,
- Approval of the Chair of the Engineering Physics program,
- Completion of the General Exam or Physics Qualifying Exams.

There are several steps required to complete the non-thesis master's, outlined in the checklist in Appendix A. The first step is to submit a *Program of Study* the semester before the planned completion of the master's degree. For students using the PhD General Exam to obtain a master's degree, the PhD *Advisory Conference Report* must also be submitted to the Graduate College (see Section IV-D). Graduate College Forms are available online (<https://www.ou.edu/gradcollege/forms-and-policies/forms>).

For students using the qualifying exams to obtain a master's degree, they will need to form a master's committee of at least 3 physics faculty and inform the Graduate Studies Chair of their committee and a date for the committee to meet. The GSC Chair will inform the Graduate College and request the *Authority to Report Form*. After this form has been provided by the college, the committee will meet to review and approve the student's coursework and qualifying exam results. The *Authority to Report Form* is signed by the committee indicating approval of the master's degree if appropriate and returned to the Graduate Studies Chair and the Graduate College.

For students who wish to obtain their master's degree using the General Exam, in addition to the steps for completing the General Exam (outlined in Section IV), a *Program of Study* form will need to be completed, and the Graduate Studies Chair will request the authority to hold this non-thesis exam and the *Authority to Report* form received from the Graduate College. If a student passes the General Exam, the *Authority to Report* form is completed and the student is awarded their master's degree as well as being admitted to candidacy for the PhD.

B: MS in Physics (Thesis Option):

The Thesis Option for a master's degree includes the completion of a research project, a written thesis, and a presentation and defense of the project. The requirements for an Physics Masters, Thesis Option are:

- A total of 30 Graduate-level credit hours consisting of
- 14 – 16 hours of Physics and/or Astronomy courses at the 4000 level and above, with all 4000 level courses approved for graduate credit,
- 2 – 4 hours of Phys 5980, Master's Thesis Research
- 12 hours of other graduate coursework as approved by the advisory committee.
- A written thesis and thesis defense.

C. MS in Physics with Emphasis in Astrophysics:

A written thesis is required for a master's degree with a focus in astrophysics. The requirements for this degree are:

- A total of 30 Graduate-level credit hours consisting of
- 0 – 3 Credit hours of Astr 4303, Stellar Astrophysics. These hours do not count if Astr 4303 was taken for credit for an undergraduate degree,
- 6 Hours of astronomy courses at the 5000 or 6000 level,
- 12 hours of Physics and/or Astronomy courses at the 4000 level and above, with all 4000 level courses approved for graduate credit,
- 2 – 4 hours of Phys 5980, Master's Thesis Research

- 5 – 10 hours of other graduate coursework as approved by the advisory committee.
- A written thesis and thesis defense.

D. MS in Engineering Physics (Thesis Option):

A physics graduate student who wishes to receive a master's degree in engineering physics must be admitted to the program at least one semester before completing the degree. The requirements for the master's degree in engineering physics are:

- A total of 30 Graduate-level credit hours consisting of
- 9 – 12 hours of physics courses approved for graduate credit with a minimum of 12 hours if the research advisor is in Engineering,
- 9 – 12 hours of engineering courses approved for graduate credit with a minimum of 12 hours if the research advisor is in Physics,
- 2 - 4 hours of EPHY 5980, master's thesis research
- 5 – 7 hours of other graduate coursework as approved by the advisory committee.
- A written thesis and thesis defense.

The Engineering Physics Chair or a duly appointed representative must approve all programs of graduate study.

E. The Master's Thesis:

There are four major fields of research in the department: Astrophysics, Atomic and Molecular and Optical (AMO) Physics, Condensed Matter Physics, and Particle Physics. Students planning to complete a master's thesis are encouraged to explore the research programs of the faculty available on the departmental web site (<https://www.ou.edu/cas/physics-astronomy>), talk with potential research advisors in several fields that might interest them, and find a advisor for their master's research. To aid in the selection of an advisor, the department offers presentations on faculty research during the Fall semester.

Students who have obtained a research advisor should notify the GSC Chair of this choice. During the semester in which a student first enrolls in 5980-Thesis Research, a *Program of Study* and an *Application for Approval of the Master's Thesis Topic and Committee Membership* form, must be filled out. These forms are available from the Graduate College's website (<https://www.ou.edu/gradcollege/forms-and-policies/forms>). Members of the thesis committee and the GSC Chair must sign this form and return it to the Graduate College.

A master's thesis typically takes about 18 months to research and write. The thesis must detail tangible results from a personally conducted research investigation. After a draft of the thesis has been prepared which meets with the approval of the research director, the student must present a reading copy to the faculty members who serve on their MS committee at least 10 working days before the defense and at least four weeks prior to the last day of final exams. (Note that the final form of the thesis cannot be prepared and submitted to the Graduate College until all committee members have read and approved a preliminary form.) Please check the Graduate College for the dates that forms must be submitted to graduate for each semester.

A thesis defense is required for the master's degree by the Graduate College. The Request for Authority for Thesis Defense should be submitted to the Graduate College when a reading copy of the thesis is submitted to the Thesis Committee, at least 10 days before the defense.

IV. PhD in Physics and Engineering Physics

A. Physics PhD Course and Credit Requirements

The PhD degree in Physics and Engineering Physics requires a minimum of 90 hours of graduate credit. The required courses for the degree are: (all but Phys 5000 are 3 credit hour courses)

Phys 5000: Intro. to Grad Studies (0 hrs)	Phys 5013: Math. Methods in Physics
Phys 5153: Classical Mechanics	Phys 5163: Statistical Mechanics
Phys 5393: Quantum Mechanics I	Phys 5403: Quantum Mechanics II
Phys 5573: Electrodynamics I	Phys 5583: Electrodynamics II

These core courses must all be passed with a grade of B or better.

For the Physics PhD, an additional 15 hours of coursework is required. This can be Physics and Astronomy courses at the 5000-level and above, Physics and Astronomy courses approved for graduate credit at the 4000 level, and/or courses approved for graduate credit in other fields at the 3000 or 4000 level and approved by the student's PhD Advisory Committee. This does not include Phys 5980 and 6980.

Other regularly scheduled graduate courses in Physics are:

Phys 5213: Nuclear & Particle Physics	Phys 5243: Solid State Physics
Phys 5323: Optics	Phys 5813: Atomic & Molecular Physics
Phys 6213: Advanced Particle Physics	Phys 6243: Advanced Solid State Physics
Phys 6283: Advanced AMO Physics	Phys 6333: General Relativity
Phys 6433: Quantum Field Theory	Phys 6443: Advanced Quant. Field Theory
Phys 6543: Advanced Quantum Optics	Phys 6860: Advanced Math Methods
Phys 5970: Special Topics Courses	

For students pursuing a physics PhD with research in astrophysics (see Sec. V below for the Astrophysics PhD), the additional 15 hours is required to at least 12 hours of astronomy courses, including Astr 4304 and any astronomy courses at the 5000 level or above. The regularly scheduled astronomy courses are:

Astr 4303: Stellar Astrophysics	Astr 5403: High Energy Astrophysics
Astr 5443: Galactic Astronomy	Astr 5453: Extragalactic Astr./Cosmology
Astr 5463: Stellar Atmospheres	Astr 5473: Stellar Interiors
Astr 5513: Interstellar Medium	Astr 5523: Adv. Observatory Methods
Astr 5900 Special Topics in Astronomy	

Students pursuing a PhD in Engineering Physics must complete the required core courses for a Physics PhD listed above. For the additional 15 hours of required courses, 12 hours must be engineering courses at the 5000 level or above and the additional 3 hours can be either a physics or engineering course approved for graduate credit. Student coursework in Engineering Physics should be approved by the Chair of the Engineering Physics Program.

Other courses on special topics will be offered from time to time. They, as well as courses outside the department, may be counted as part of the 15 hours at the discretion of the Advisory Committee and the Graduate Studies Chair.

The remaining 54 credit hours needed to reach 90 hours may be a mixture of formal coursework, seminar courses, special studies (Phys 5990), and research for the doctor's dissertation (Phys 6980). Other appropriate courses approved for graduate credit in mathematics, chemistry, engineering, or other fields may also be applied towards the 54 hours with the approval of a student's Doctoral Committee.

Additional course requirements that are appropriate to the student's area of research specialization may be determined and required by their Advisory Committee.

In Appendix C, a sequence of courses to be taken during the first two years that enables the student to pass the Qualifying Exam in a timely manner is shown. The exact timescale for courses taken is determined in consultation between the student and their academic advisor.

There are several important rules and requirements of the Graduate College:

- No more than 15 hours of 3000 or 4000 level courses, approved for graduate credit, can be applied to the PhD.
- No more than 12 hours of credit in Physics and Astronomy at the 4000 level can be applied to the PhD.
- No courses in Physics and Astronomy at the 3000 level can be applied to the PhD.
- No more than half of the credits for OU courses (or total OU and transfer courses), excluding Phys 6980, can be S/U graded. This includes, for example, independent study courses Phys 5990.
- After first enrolling in Doctoral Research (Phys 6980, 2 hours or more) a student must continuously enroll in at least 2 hours of Phys 6980 every Fall and Spring semester until they complete their PhD. Students graduating during a summer semester must also enroll in Phys 6980 during that summer.
- To graduate, a student must have a GPA of 3.0 or above.
- A student who has received 9 or more credit hours of C or below will be dismissed from the program. For this rule, a grade of C or below cannot be replaced if a course is retaken. A student dismissed for this reason may be considered for admission to a master's degree program.

B. Physics Qualifying Exams:

The Qualifying Exams (Qualifiers) are a departmental requirement, meant to determine students' basic understanding of physics concepts. A student may receive a master's degree based on the Qualifiers, following the Graduate College procedures outlined in Section III above.

The following policies cover the operation of the Physics Qualifying exams:

- The physics PhD qualifying exam consists of three separate tests: Classical & Statistical Mechanics, Quantum Mechanics, and Electricity and Magnetism. Each test is taken and passed separately.
- The qualifiers are held in August and January, the week before the start of the semester. Each test is held on a separate day of that week.
- Students have two official attempts to pass each qualifier. If necessary, a student may petition the faculty for a third attempt as described below.
- During their first year in the program, students may take a free attempt at any one or more of the qualifying exams. Students may pass an exam on a free attempt, but these attempts do not count as one of the official attempts. Only one free attempt at any single exam is allowed.
- Students are required to take a qualifying exam after passing the related core graduate courses: Phys 5153 and Phys 5163 (Classical and Statistical Mechanics) for the Classical & Statistical Mechanics Exam, Phys 5403 (Quantum Mechanics II) for the Quantum Mechanics exam, and Phys 5583 (Electrodynamics II) for the Electricity and Magnetism exam. Not taking a qualifying exam after passing the related course is considered a failure, except if a student has requested and been given an exception by the faculty.
- If required to take multiple exams for any one semester, a student need only take, at most, two exams in August or one exam in January. The student can choose which of the required exams to take.
- All students should have attempted all exams at least once by their fifth semester. Exceptions can be made through petitions to and approval of the faculty.

Test Content:

- Each exam covers materials from both standard undergraduate and graduate courses. The tests are roughly 60% undergraduate-level and 40% graduate-level.

- Information about the content covered and past exams are available on the departmental website. (<https://www.ou.edu/cas/physics-astronomy/students/graduate/qualifiers>)
- Graduate material on the Quantum and Electricity and Magnetism qualifiers will be from the first semester of the related core graduate courses.

Test Structure:

- Each exam is 3 ½ hours long. Students with academic accommodations for longer test times should notify the GSC chair so that the accommodations can be satisfied.
- Each exam will consist of 5 questions. 3 questions are considered undergraduate level, and 2 questions are considered graduate level. The Classical & Statistical Mechanics exam will include at least two classical mechanics questions and at least two statistical mechanics questions.
- Individual faculty members write each question. Questions and exams are reviewed and modified as needed by the Qualifier Committee and GSC.

Exam Grading:

- 4 of the 5 questions on the exams will count for grading the exams.
- A student may answer only 4 questions and get full credit on the exam. If a student answers 5 questions, or parts of 5 questions, the question with the lowest score is dropped and the other four questions will be used to determine the grade.
- Each question is graded out of 10 points. A passing grade for a question is 5 points or more.
- Each question is graded independently by two faculty members. If the two grades for a student differ by more than 2 points, or if one grader gives a passing grade and the second does not, the graders discuss the question and change their scores to come into agreement. The average of the final two scores count as the grade for the question.
- An automatic pass for an exam is passing 2 or more questions with 5 or more points and earning 20 points or more total on the exam.

- An automatic fail for an exam is passing less than 2 questions with 5 or more points.
- A Master's Pass for an exam, which can be used to earn a non-thesis master's degree, is passing 2 or more problems and earning at least 16 points total, or earning at least 20 points total on an exam.
- The GSC reviews the exam grades and recommends results for exams that do not meet either the automatic pass or automatic fail criteria.
- The entire faculty reviews the exams results and approves the results and/or recommends changes to the GSC recommendations. In special circumstances, the faculty can set other conditions for passing an exam, such as the Special Oral Exam described below.

Feedback for Students:

Shortly after the final recommendations of the faculty, students will receive notification of their results.

- Students who pass one or more exams are informed of the results and updated on their progress towards the PhD including next steps as appropriate.
- Students who do not pass one or more exams are informed of the results and given the option to receive general feedback regarding the exam(s) they did not pass.
- Feedback to students for an exam can be provided by the GSC chair and/or the editor of the exam. The feedback is meant to help the student succeed on future attempts at the qualifier. Specifics, such as scores on each problem, are not given.

During review of qualifier results, the faculty can vote to give a student the option of passing a qualifier through a special oral exam. A committee will be formed to administer the oral consisting of three faculty as voting members and the student's advisor as a non-voting member. If a student decides to take the oral exam, it should be scheduled in the first two months of the semester. The material covered on the oral is limited to the specific qualifier topic. The qualifying exam the student did not pass is

used as a starting point for the oral, with related questions asked as appropriate. The oral should be approximately one hour, and never more than two hours.

The result of the oral is determined by a majority of the voting members of the oral committee. If a student passes the oral, that counts as passing the related qualifying exam. If a student does not pass the oral, this does not count as another attempt at the exam, and a student may either take a second attempt as usual, petition for a third attempt, or, if the oral was for a third attempt, will be dismissed from the PhD program.

Students who have not passed an exam after two official attempts may petition the faculty for a third attempt on a Qualifying Exam. The petition is made by submitting a letter to the GSC before November 1 for Fall semesters or April 1 for Spring semesters. Petitions should explain why a third attempt is warranted and be accompanied by a supporting letter from the student's faculty advisor further justifying the merits of the petition. Third attempts are not automatic; they will be judged upon the student's performance in courses, Qualifying Exams, research progress, and general promise for obtaining a PhD. Petitions from students who have been in the program for more than 4 semesters will be heavily weighted on their progress on research. The petition is reviewed by the GSC and presented to the faculty with a recommendation to approve or deny the petition. The final decision is made by a vote of the faculty.

Physics majors who will be pursuing research in astrophysics must take an additional fourth exam covering their field. Only students with a declared astrophysics emphasis and an astrophysics advisor are eligible to take the astrophysics Qualifying Exam. See Section V below.

V. PhD in Astrophysics

A. Astrophysics PhD Course and Credit Requirements

The minimum of 90 hours or more of graduate credit must include the following core courses:

Phys 5000: Intro. to Grad Studies (0 hrs)	Phys 5013: Math. Methods in Physics
Phys 5153: Classical Mechanics	Phys 5163: Statistical Mechanics
Phys 5393: Quantum Mechanics I	Phys 5573: Electrodynamics I

These core courses must all be passed with a grade of B or better.

For the Astrophysics PhD, an additional 15 hours of coursework is required. These should be Astronomy or Physics courses at the 5000-level and above that cover applications of physics principles to astrophysics settings. These may also be courses approved for graduate credit in other fields at the 3000 or 4000 level if approved by the student's PhD Advisory Committee. This does not include Phys 5980 and 6980.

The regularly scheduled astronomy courses applied to the astrophysics PhD are: (Astr 4303 if a related course was not taken as an undergraduate)

Astr 4303: Stellar Astrophysics	Astr 5403: High Energy Astrophysics
Astr 5443: Galactic Astronomy	Astr 5453: Extragalactic Astr./Cosmology
Astr 5463: Stellar Atmospheres	Astr 5473: Stellar Interiors
Astr 5513: Interstellar Medium	Astr 5523: Adv. Observatory Methods
Astr 5900 Special Topics in Astronomy	

Other courses on special topics will be offered from time to time. They, as well as courses outside the department, may be counted as part of the 15 hours at the discretion of the Advisory Committee and the Graduate Studies Chair.

The remaining 54 credit hours needed to reach 90 hours may be a mixture of formal coursework, seminar courses, and research for the doctor's dissertation (Phys

6980). Other appropriate courses approved for graduate credit in mathematics, chemistry, engineering, or other fields may also be applied towards the 54 hours with the approval of a student's Doctoral Committee.

Additional course requirements that are appropriate to the student's area of research specialization may be determined and required by their Advisory Committee.

In Appendix D, a sequence of courses to be taken during the first two years that enables the student to pass the Qualifying Exam in a timely manner is shown. The exact timescale for courses taken is determined in consultation between the student and their academic advisor.

There are several important rules and requirements of the Graduate College:

- No more than 15 hours of 3000 or 4000 level courses, approved for graduate credit, can be applied to the PhD.
- No more than 12 hours of credit in Physics and Astronomy at the 4000 level can be applied to the PhD.
- No courses in Physics and Astronomy at the 3000 level can be applied to the PhD.
- No more than half of the credits for OU courses (or total OU and transfer courses), excluding Phys 6980, can be S/U graded. This includes, for example, independent study courses Phys 5990.
- After first enrolling in Doctoral Research (Phys 6980, 2 hours or more) a student must continuously enroll in at least 2 hours of Phys 6980 every Fall and Spring semester until they complete their PhD. Students graduating during a summer semester must also enroll in Phys 6980 during that summer.
- To graduate, a student must have a GPA of 3.0 or above.
- A student who has received 9 or more credit hours of C or below will be dismissed from the program. For this rule, a grade of C or below cannot be replaced if a course is retaken. A student dismissed for this reason may be considered for admission to a master's degree program.

E. Astrophysics Qualifying Exams:

The Astrophysics Qualifying Exams (Qualifiers) are a departmental requirement and consist of a written and an oral exam.

The following policies cover the operation of the Astrophysics Qualifying exams:

- The astrophysics PhD qualifying exam consists of a written exam and, after passing the written test, and oral exam
- The qualifying exam is given in August and January, the week before the start of the semester.
- Students have two official attempts to pass the qualifier. If necessary, a student may petition the faculty for a third attempt as described below.
- During their first year in the program, students may take a free attempt at the astrophysics qualifying exam. Students may pass the exam on their free attempt, but this attempt does not count as an official attempt if the student does not pass. Only one free attempt is allowed.
- All students should have attempted the astrophysics qualifying exam at least once by their fifth semester. Exceptions can be made through petitions to and approval of the faculty.

Test Content:

- Check description.
- Information about the content covered and past exams are available on the departmental website. (<https://www.ou.edu/cas/physics-astronomy/students/graduate/qualifiers>)

Test Structure:

- The exam is 3 ½ hours long. Students with academic accommodations for longer test times should notify the GSC chair so that the accommodations can be satisfied.
- The exam will consist of 5 questions covering a range of topics in astrophysics.
- Individual faculty members write each question. Questions and exams are reviewed and modified as needed by the Qualifier Committee and GSC.

Exam Grading:

- 4 of the 5 questions on the exams will count for grading the exams.
- A student may answer only 4 questions and get full credit on the exam. If a student answers 5 questions, or parts of 5 questions, the question with the lowest score is dropped and the other four questions will be used to determine the grade.
- Each question is graded out of 10 points. A passing grade for a question is 5 points or more.
- Each question is graded independently by two faculty members. If the two grades for a student differ by more than 2 points, or if one grader gives a passing grade and the second does not, the graders discuss the question and change their scores to come into agreement. The average of the final two scores count as the grade for the question.
- An automatic pass for an exam is passing 2 or more questions with 5 or more points and earning 20 points or more total on the exam.
- An automatic fail for an exam is passing less than 2 questions with 5 or more points.
- The GSC reviews the exam grades and recommends results for exams that do not meet either the automatic pass or automatic fail criteria.
- The entire faculty reviews the exams results and approves the results and/or recommends changes to the GSC recommendations. There is not an option for a special oral exam for astrophysics as there is for the physics qualifying exams.

Feedback for Students:

Shortly after the final recommendations of the faculty, students will receive notification of their results.

- Students who pass the written exam are informed of the results and informed of the next steps, including the oral astrophysics exam.
- Students who do not pass the exam are informed of the results and given the option to receive general feedback regarding the exam.

- Feedback to students for an exam can be provided by the astrophysics member of the GSC and/or the editor of the exam. The feedback is meant to help the student succeed on future attempts at the qualifier. Specifics, such as scores on each problem, are not given.

Students who have not passed the astrophysics qualifying exam after two official attempts may petition the faculty for a third attempt. The petition is made by submitting a letter to the GSC before November 1 for Fall semesters or April 1 for Spring semesters. Petitions should explain why a third attempt is warranted and be accompanied by a supporting letter from the student's faculty advisor further justifying the merits of the petition. Third attempts are not automatic; they will be judged upon the student's performance in courses, the qualifying exam, research progress, and general promise for obtaining a PhD. Petitions from students who have been in the program for more than 4 semesters will be heavily weighted on their progress on research. The petition is reviewed by the GSC and presented to the faculty with a recommendation to approve or deny the petition. The final decision is made by a vote of the faculty.

The oral part of the Astrophysics Qualifying Exam will be given by members of the student's Doctoral Advisory Committee after completion of the written part of the Astrophysics Qualifying Exam. The Astrophysics oral qualifier can be taken during or after the semester when the student passes the written Astro qualifier. The qualifier will include questions on a variety of topics related to astronomy, like the written qualifier. The committee overseeing the oral qualifier should consist of at least 3 astro faculty and should include the student's advisor.

VI. Progress to the PhD Degree

F. Advisory Conference:

Each student must select an Advisory Committee and have their Advisory Conference and submit their Advisory Conference Report/Program of Study by the end of their second year. Failure to do so by the end of the second year could jeopardize the student's eligibility for tuition waivers in their third year. This limitation on eligibility for tuition waivers reflects a Graduate College rule. Any

student encountering challenges to submitting these forms fulfilling these requirements on time should talk with the chair of the GSC.

Each student should discuss their prospective research with their research director before selection of an Advisory Committee. The Advisory Committee should consist of at least *three additional faculty members (including one from outside the department)* who must be a member of the graduate faculty and will serve on the Advisory Committee. At least one of the departmental committee members should be from a different research group than that of the student's advisor. Any additional committee members from outside OU must be approved by the Dean of the Graduate College.

The purpose of the Advisory Committee is to help the student formulate an overall plan of work for their doctoral degree. The student's previous graduate record will be examined to determine future courses that should be taken. The committee will work to develop a well-balanced program suitable to the student's background, taking into consideration their educational and professional needs.

The *Advisory Conference Report* sets the specific personalized course requirements for each student's degree program. This report (a form that can be obtained from the Graduate College web site) must be signed by all members of the Advisory Committee and by the Chair of the Graduate Studies Committee, then be submitted to the Graduate Dean for approval. (If any changes in the *Advisory Conference Report* or in the membership of the permanent Doctoral Committee become necessary, a *Request for Change in Doctoral Advisory Conference Report* form, approved by the original committee holding the Advisory Conference, must be approved by the Graduate Dean.) Any requests for transfer credit for courses taken prior to matriculation at OU should be made at the time of the Advisory conference in the form of a petition to the Dean of the Graduate College.

G. Doctoral Committee:

In most cases, the Advisory Committee later becomes the Doctoral Committee.

In any case, the Doctoral Committee membership follows the same rules as the Advisory Committee: it consists of the student's advisor and at least three other faculty members (including one from outside the department) who must be a member of the graduate faculty. At least one of the departmental committee members should be from a different research group than the student's advisor. The Doctoral Committee will supervise the preparation of the student's dissertation and conduct the final oral defense of their dissertation. Members of their Doctoral Committee will also help guide and encourage the student throughout their career as a doctoral candidate.

H. Annual Evaluation of Doctoral Students:

The appropriate Advisory or Doctoral Committee shall annually evaluate each PhD student who has passed the Qualifying Exams and has had their advisory conference. (See Sec. II.E) The committee shall conduct this evaluation as an informal discussion with the Candidate. This annual interview replaces the interview by member(s) of the GSC. The results of the evaluation shall be transmitted to the GSC, and will form the basis of the yearly summary evaluation letter given to the student and placed in the student's file by the chair of the GSC.

I. General Examination:

A General Examination for the PhD degree is required by the Graduate College. That examination consists of two parts, a written and an oral exam. In the Homer L Dodge Department of Physics and Astronomy, the written portion consists of a critical review of the subject to be discussed followed by an oral presentation, sometimes called the candidacy exam. This exam tests the student's competence in an area of special interest to them as well as their general background in physics. The General Exam topic is determined in consultation between the student and their advisor. The topic may be part of the student's dissertation research, for example, or their first research project. In short, it is an exam to test that the student has the skills needed to complete a substantial research project. *It is strongly recommended that the General*

Exam be completed no later than the Fall semester of the student's fourth year. A Physics PhD student may not schedule the General Exam until all three physics Qualifying Exams have been passed for non-astrophysics students, and all four Qualifying Exams have been passed for students with an emphasis in Astrophysics. Astrophysics PhD students may schedule the General Exam upon completion of the Astrophysics Qualifying Exam.

When a student is ready to take their General Exam, they should obtain an application for taking the General Examination at the Graduate College web site. Additionally, the departmental General Exam Checklist with a required schedule, available on the departmental web site, should be followed, completed, and returned to the chair of the GSC at appropriate times as indicated on the checklist. At least two weeks before requesting authority for the exam from the Graduate College (and also at least four weeks before the oral exam), the student must supply the committee with a 10-20 page report complete with references to the literature. Approval of the report will constitute passing the written portion of the General Examination. The request for authority to hold the oral portion of the General Exam should be signed by the Advisory Committee and returned to the Graduate College at least 2 weeks before the exam is scheduled. The Graduate Dean will normally approve the request if it is in order and if the student has an overall grade point average of 3.0 or higher. The Dean will notify the student and the chair of the Advisory Committee of their approval. The student must notify all members of the committee of the time and place of the exam, as well as publicize the exam to the department so that others may attend.

For the oral part of the General Exam, the student should present a discussion of their chosen topic. This is a public discussion and should be advertised to the department by email several days before it is held. This part of the exam is usually limited to 50 minutes. Following the presentation, members of the audience may ask questions, and then the committee may further question the student with only the student and committee members present on topics and principles used in or related to the previous discussion, and possibly on general principles of physics.

All members of the committee must participate in the General Exam either in person or remotely by audio or video conferencing. When the exam is completed, the committee chair will submit a report to the Graduate College and submit the departmental checklist to the chair of the GSC. The Graduate College report will contain a statement of the results of both the written and oral parts of the General Exam. After passing the General Exam, the Graduate Dean will admit the student to candidacy for the PhD degree.

A minimum of four signatures must be on the report. The Dean of the Graduate College, who will then make the final decision, will review any report with dissenting votes. If a student fails the General exam, they may repeat it once (during the next semester) at the discretion of the committee. Note that if this meeting also serves as a terminal Master's Exam, then a second failure will result in dismissal from the Graduate College.

J. Doctoral Dissertation:

After passing the General Exam, most of the PhD candidate's time will be devoted to research and writing the dissertation. The student should promptly select a dissertation topic in consultation with their research director. At this point, the student should be primarily enrolling in PHYS 6980 (Research for Doctor's Dissertation), and the student must enroll in at least 2 hours of 6980 during each subsequent semester until receiving their degree. A student need not enroll in the summer if they are not planning on graduating over the summer.

Finding a research advisor and a research topic is the responsibility of the student in consultation with the departmental faculty and GSC as needed. It is to be stressed that completing and defending the results of an original research project is considered the most important part of the PhD program. The student can expect this research project to take from 2 to 4 years of intensive work after completion of formal coursework. The Graduate College rules state that a student has five years to complete their doctorate after passing their General Examination.

The dissertation shall be a complete discussion, including background material, of a substantial, original piece of research that *the student* has conducted. The work described in the dissertation should constitute a significant contribution to knowledge, and in the view of the doctoral committee, should be either published or publishable in a refereed journal in the field. Instructions for the formatting of the dissertation are available at <https://www.ou.edu/gradcollege/forms/thesis-dissertation-packet>.

Graduate College guidelines state that the Doctoral Committee must be given a reading copy of the thesis that has been vetted by the student's advisor at least four weeks before the intended defense date. This will give the committee enough time to give provisional approval of the written thesis before proceeding to the oral defense, which is a Graduate College and departmental requirement. Faculty are encouraged to return revisions to the student two weeks before the defense date, so that the revisions can be incorporated into the final version of the dissertation.

K. Final Examination:

After successfully completing research and writing a dissertation, the student must prepare to defend their work. Authority to hold a thesis defense must be given by the Graduate College. However, the student must complete an online degree check at <https://www.ou.edu/gradcollege> at least two weeks **before** submitting a *Request for Authority for Dissertation Defense* form to the Graduate College (i.e., at least four weeks prior to the defense date) as stated in the Graduate College Bulletin and the departmental checklist. This check assures that the student has met all the course requirements for the degree and is in good academic standing.

When the student, their advisor, and their Doctoral Committee are ready for the defense to proceed, the student must submit a *Request for Authority* form signed by the research advisor and the graduate liaison (i.e. chair of the GSC).

The Graduate Dean will then direct the other members of the Doctoral Committee to hold the doctoral exam. This final oral exam for the PhD degree is a defense of the dissertation and is open to the public. An email should be sent to the department advertising the defense. All committee members must participate either in

person or remotely by audio or video conference. One member of the committee, other than the chair or the outside member, may be absent with permission of the Graduate Dean. After the student completes the oral presentation, answers questions from the general audience, and answers questions from the Doctoral Committee in a closed session, the committee will vote whether accept or reject the thesis. If accepted, the committee may request that minor changes or corrections be made. The student should budget time to allow for making such changes in the dissertation.

Within 72 hours after the exam, the chair of the committee will report the decision of the committee to the Graduate Dean and to the chair of the GSC. The defense must take place by the deadline in the Academic Calendar on line and may not take place during the week of final exams. Once the dissertation has been successfully defended, the student must deposit an electronic copy on ShareOK. For the latest rules and regulations, see the Graduate College Bulletin.

Note: There is a caveat to the Graduate College rules for submission of the dissertation. These rules are only to assure that the student will be listed as receiving their degree in the particular semester. In fact, a student may complete their dissertation and take final orals anytime, and they will be certified as having completed the degree. If they miss the Graduate College deadlines, they will be listed as formally receiving the degree the following semester, but do not need to be enrolled or in residence during that semester.

L. Doctoral Degrees in Engineering Physics:

To earn a PhD in the Engineering Physics Program (Doctor of Philosophy in Engineering and Applied Science) a student must satisfy the general requirements of the Graduate College and the College of Engineering, in addition to the course requirements for a physics PhD. Other course requirements specific to the degree program are determined by the student's Advisory Committee. It is important that the Chair of Engineering Physics (or a designated alternate) advise the student before

entering the program in order that an Advisory Committee is properly assigned and so that a program of coursework may be determined. See the Chair of Engineering Physics for details regarding the requirements for a PhD in Engineering Physics.

All students wishing to work for a PhD in the Engineering Physics program must pass the Physics Qualifying Exams as describe in Section IV.B.

V. FINANCIAL SUPPORT

A. Teaching and Research Assistantships:

Most full-time graduate students in the department receive some form of financial support if they desire it – either as a Graduate Teaching Assistant (GTA or TA) or Graduate Research Assistant (GRA or RA). Additionally, other fellowships (with no teaching duties) are usually awarded each year. If a student is admitted without support and does well in their first semester of coursework, the student is encouraged to talk with the Chair of the GSC about the possible availability of an assistantship during a subsequent semester. Supported students, whether on an RA or TA, **must** be enrolled in at least 5 credit hours in every Fall and Spring semester during which they are supported.

Because most GTA assignments require a certain level of English proficiency, international students and others whose native language is not English who are supported as departmental GTAs receive a monthly stipend that is \$200 less than the stipend for native English speakers until they pass the university's English language requirements. Half the stipend increase occurs when the B level is achieved, and the balance when the language requirement is passed at the A level. The university offers assistance in reaching these levels of English proficiency. It is recommended that all students whose native language is not English strive to earn an A level in the English proficiency to be able to fulfill all the necessary GTA positions within the department.

GTA stipends are usually awarded for 10 months (i.e., Fall and Spring semesters) based on the student's academic progress, as evaluated by the GSC, and the student's performance and promise as a teacher. The average TA position requires about 13 hours of work per week.

No graduate student will be appointed to teaching duties in excess of 0.50 FTE (half time) during a regular semester except where there is a clear and unusual need. Proposals for such exceptions should be discussed in advance with the Graduate Dean and (perhaps) the Provost.

Students holding TA position are expected to take their duties seriously and perform them conscientiously. For all TAs new to teaching at OU, there are university sponsored training sessions. All new graduate students (including those who entered during the previous Spring or Summer semesters) receiving departmental support in Physics, Astrophysics, and Engineering Physics are required to take this training. Some topics covered in the Introduction to Graduate Studies workshop held during the first semester in residence also relate to TA duties. [The Graduate College will contact each student with information about the prerequisites and requirement needed to be appointed as a GTA, which may differ slightly for students whose native language is, or is not, English.](#)

Be advised that to retain a TA position, each student must meet the requirements of the Graduate College regarding minimum enrollment and grade point average, make satisfactory progress towards their degree, and perform satisfactorily in their GTA responsibilities. Generally, if the GSC is considering withdrawing a TA offer due to one of the above reasons, there will first be conversations with the student one semester in advance of any status change, except in cases of malfeasance where termination may be immediate. All effort will be made to alleviate any problems before GTA support is withdrawn. If a student's GTA duties require contact with other students, the GTA will be evaluated each semester by the professor in charge of the course. This evaluation and constructive feedback will be made available to the GTA to help improve their teaching skills.

It is to be stressed that the continued awarding of financial support in the form of TA stipends or RA stipends is dependent on progress toward the degree. These assistantships are not just jobs where the student is paid for services rendered, but are primarily intended to aid the pursuit of an advanced degree. It is expected that an RA or TA position, combined with graduate studies, will not allow the serious student any time for additional external employment. Moreover, it is often the case for international students that visa requirements prohibit outside employment. It is the policy of the department that no student supported by the department, either in the form of a TA or

RA shall have employment outside the department. Please consult the Chair of the GSC if there are any questions about this policy.

Most summers, TA positions are available to teach introductory classes. Interest in summer TA positions will be solicited by the chair of the GSC in the Spring semester.

If possible, each student is encouraged to switch from a GTA to an GRA if circumstances permit. For example, a student's research advisor may pay the student to work on their research if the advisor has an externally funded grant. Stipends for GRA work are determined by the research advisor and may be higher than GTA stipends.

Graduate assistantship stipends are divided up into 5 payments per semester (except summer sessions). Academic year appointments beginning in the fall become effective on August 1. Payment (usually by electronic direct deposit) is done on the last working day of each month, and is equal to one-tenth of the total academic year stipend (less taxes, etc.). , The last stipend check is issued on the last working day of May. Graduate students are not required to *work* beginning August 1, but should be at the university well before the beginning of classes. New students should check their letter of admission and information from the Graduate College, which describe workshops and other details that may require an early arrival on campus. Summer appointments are separate.

B. Financial Support Policy

Progress towards degree will be the primary, but not sole, criterion used by the Homer L Dodge Department of Physics and Astronomy in determining whether a graduate student in Physics, Astronomy, or Engineering Physics is eligible to receive financial support from department funds in the form of a GTA or GRA stipend. (Progress towards degree includes academic progress, performance, and ability as demonstrated in coursework, the Qualifying Exam, the General Exam, teaching ability, and research.)

Students in the PhD degree program that demonstrate satisfactory progress towards their degree will be eligible for financial support from department funds during the first two full semesters (Fall and/or Spring semesters) of graduate work. Students in

a terminal master's degree program will be considered for financial support from department funds, but at a lower level of priority than PhD students. This does not exclude a student seeking a terminal master's degree from receiving financial support from the department. This only states that PhD students will be considered first for this form of support. Masters students who do receive support will be eligible to receive such support during their first two full semesters if they demonstrate satisfactory academic merit.

After this initial two semesters of support a student demonstrating satisfactory academic merit receives additional financial support from department funds in the form of assistantships usually through a request of a faculty mentor. *The goal of this policy is to get students involved in research as soon as possible.* This mentor must be a faculty member or adjunct faculty member of the Homer L Dodge Department of Physics and Astronomy. After the initial period of financial support, a student whose research advisor is not a faculty member or adjunct faculty member in the department is expected to be supported by funds provided by the research advisor, and thus has a low priority for receiving financial support from department funds. Master's degree candidates following the non-thesis option, however, may be supported by department funds past their second semester of graduate study at the discretion of the GSC.

This financial support policy will apply to all teaching and research assistantships funded by the department. Fellowships, research assistantships funded by external grants, and assistantships administered by the Engineering Physics Program, may be awarded using other criteria.

C. Stipend Increases

As an incentive to progress through the program, the department offers steps in stipends for TAs when the following milestones are achieved:

- 1) For international students when they become qualified to teach students as determined by the EAP office at least at the B level. To receive the full stipend increase, passing at the A level is required.

2) For PhD students when all parts of the Qualifying Exams are passed.

3) For PhD students when the General Examination is passed and they are advanced to candidacy.

The stipend increases take effect the semester following that in which the milestone is achieved.

D. Graduate College Tuition Waiver Program

All full-time graduate students in academic good standing - who are not residents of Oklahoma - who receive a half time (0.50 FTE) departmental appointment either as a GTA or GRA and are working toward a degree program in Physics, Astrophysics, or Engineering Physics, are eligible for non-resident tuition waivers from the Graduate College.

All full-time graduate students in academic good standing - U.S. citizens as well as international students - who receive a half time (0.50 FTE) departmental appointment either as a GTA or GRA and are working toward a degree program in Physics, Astrophysics, or Engineering Physics, are eligible for an in-state tuition waiver for a maximum total of 90 credit hours over their entire studies. (In addition to tuition, there are fees, which cannot be waived by state law, and therefore must be paid by the student.) The Graduate College will **only grant 90 hours of tuition waivers** to a doctoral student which covers the 90 credit hours required to get a doctorate (and 30 or 32 for masters students). Thus it is important for a student to plan their course selection in a manner that results in 90 total credit hours upon degree completion. A petition for additional credit hour tuition waivers may be made to the Graduate College.

E. Student Health Plan

The University of Oklahoma offers a Student Health Plan to all graduate students enrolled in five or more credit hours each semester or enrolled in thesis/dissertation hours. Students appointed one-half time or more as a graduate teaching or research assistant may sign up for a certain health coverage program at no charge, which is a benefit of employment. A more comprehensive plan is also available by paying an additional cost above the subsidy amount. Detailed information on the plan is available from the Norman Campus Goddard Health Center, 620 Elm Avenue or at <https://www.ou.edu/healthservices> and at <https://ou.myahpcare.com>.

VI. DODGE PHYSICS COMPLEX

A. Nielsen Hall and Lin Hall:

The Dodge Physics Complex consists of two buildings. Nielsen Hall was originally constructed in 1946 as the “Research Institute” and expanded in 2000 to add classroom space and expanded further in 2004 to add office space. Lin Hall was constructed in 2018 as a state of the art laboratory and office facility.

The complex and the department are named for Homer Levi Dodge. Among his many accomplishments as a scientist, professor, administrator, dean, and president, he became chair of the University of Oklahoma Physics Department in 1919 and Dean of the graduate school in 1926, and was one of the founders of the American Association of Physics Teachers (AAPT) in 1930. Information about Homer L Dodge can be found at <https://ou.edu/content/dam/cas/physics-astronomy/docs/newsletters/HomerDodge.pdf>.

B. Building and Lab Access, Study Areas, Keys:

New graduate students who would like a desk and office space in the Dodge Complex for personal study should see the Assistant to the Department Chair in the main office. Incoming students who will have GTA appointments will be assigned a desk. See the Assistant to the Department Chair for this assignment.

Also, see the Assistant to the Department Chair for any needed keys for evening or weekend access to the building and to specific study areas and/or labs. If a student’s research requires the use of a departmentally controlled room after hours, they may obtain keys with the permission of their research advisor approved by the Chair of the Department.

C. General Safety Procedures:

While carrying out research, every person is responsible for using equipment and conducting experiments safely. All students should talk with their research advisor and fellow students about the innumerable hazards associated with the use of high voltages, radioactive materials, lasers, high pressures, inflammable and cryogenic liquids, etc. Group and departmental safety training is available. Fire extinguishers and fire alarms are located in several places on every floor. Every person in the department should be familiar with their locations! All users of computers, electronics, and other research resources are responsible for care and maintenance of the equipment. Online safety training is required for all students, staff, and faculty.

D. Student Shop:

A student shop is available for student use. Use of the shop requires mandatory training.

E. Computing:

The department possesses a network of workstations and PCs. The Nielsen Hall Network (nhn) is part of the campus network and accounts may be obtained on the nhn network and other university computers. The university hosts the OU Supercomputing Center for Education and Research (OSCER), of which the high-energy group's grid computing network is part of. Internet wireless access is available throughout the campus and wired connections are located in the Dodge Physics Complex. A student's research advisor and the Computer Systems Manager (CSM) can assist in meeting any computing needs.

The university sets up e-mail accounts when a student is initially admitted. The department uses e-mail on a regular basis to contact graduate students, individually and as a group, about upcoming programs, job opportunities, etc. New graduate students should contact the CSM as soon as possible to set up an e-mail alias or

account so that messages can be received via the department's internal group aliases.
(The GSC chair can provide information about how to contact the current CSM).

*Our goal is to provide a productive and enjoyable educational experience
for all students!*

APPENDICES

APPENDIX A

Quick guide to steps in MS programs in Physics, Astronomy, and Engineering Physics.

For up to date information and schedule see the departmental checklists found at <https://ou.edu/cas/physics-astronomy/grad/current-students>

I. Physics Masters

A. Non-thesis Track

- 1) Confirm enrollment in the Physics MS program. This enrollment will normally be automatic for incoming PhD students.
- 2) Complete 32 hours of appropriate graduate coursework with a GPA above 3.00.
 1. Twenty of those hours must be Physics and Astronomy department courses number 4000 and above (excluding PHYS 5980).
 2. The remaining 12 can be taken from other departments only if they are listed with a G before the course number.
 3. No more than 12 credit hours can be below the 5000 level.
 4. The Advisory Committee may ultimately allow substitutions of equivalent courses. Up to 8 hours of previous graduate work may be transferred.
- 3) Submit *Program of Study Form* for the MS degree the semester before completing the nonthesis exam. (See the deadline dates in the Graduate College non-thesis masters packet at <https://www.ou.edu/content/dam/gradcollege/docs/gc-non-thesis-packet.pdf>).
- 4) Pass Physics PhD Qualifying Exams at least at the master's level or pass the General Exam and meet with the MS Committee to formalize the non-thesis oral exam. This constitutes nonthesis exam if permission to take this exam is secured from the Graduate College in advance.

- 5) Graduate liaison requests *Authority Report Form of the Non-thesis Examination* from the Graduate College which is signed and submitted by examination committee within one week after exam decisions are made.
- 6) Students passing the exam are awarded a degree. Students failing may be allowed one additional attempt by petitioning the Graduate College. If the student fails the exam a second time, the student will not be allowed to continue in the graduate program.

B. Thesis Track

1. Confirm enrollment in the Physics MS program. This enrollment will normally be automatic for incoming PhD students.
2. Complete 30 hours of appropriate graduate coursework with GPA of 3.0 or better.
 - a. These must include 18 hours of graduate courses in Physics and Astronomy, excluding PHYS 4153 and PHYS 4300.
 - b. At least 2-4 credit hours of Research for Master's Thesis (Physics 5980) must be included in the 30 hours; these can count towards the above 18.
 - c. The remaining 12 credit hours may include PHYS 4153 and PHYS 4300, and may be taken from other departments if they are listed with a G before the course number.
 - d. No more than 12 credit hours can be below the 5000 level.
 - e. The MS Committee may ultimately allow substitutions of equivalent courses.
3. Arrange for a research advisor and choose at least two other faculty for the MS Committee.
4. Fill out the *Program of Study Form* and a *Master's Topic and Committee Membership* form, and submit them to the Graduate College the semester before planned graduating.
5. Complete research project and write thesis.
6. Obtain approval of thesis by the MS Committee.

7. At least 10 working days before the thesis defense, turn in the dissertation to the committee and complete the *Request for Authority for the Thesis Defense* form. The Committee will then be issued the *Authority Report Form for the Thesis Defense* by the Graduate College. The Authority form must be returned prior to the thesis defense. The thesis defense must take place no later than the two weeks prior to the last day of final exams
8. Pass thesis defense.

II. MS in Physics with Emphasis in Astronomy

This program is identical to the thesis Masters above. There is no “non-thesis option” for this degree. However, Astronomy students can obtain a non-thesis MS in physics without the astronomy emphasis by following the rules for the non-thesis degree given above.

III. Engineering Physics

Both the thesis and non-thesis options are identical to that of the Masters degree in Physics, except that the course requirements differ in the E-Physics program.

APPENDIX B

Quick guide to steps in PhD programs in Physics, Astrophysics, and Engineering Physics

For up to date information and schedule see the departmental checklists found at <https://ou.edu/cas/physics-astronomy/grad/current-students>

- I. Complete 90 credit hours of graduate course work with a GPA above 3.00 and no more than 2 grades of C or below, ever.
 - A. Of those 90 credit hours, 36 hours must be graduate coursework in Physics and Astronomy at the 4000 level and above for the Physics and Engineering Physics PhD, and 30 hours must be graduate coursework in Physics and Astronomy at the 4000 level and above for the Astrophysics PhD.
 - B. Of those 36 hours for the Physics and Engineering Physics PhD, 21 must be in the specified core courses for the Physics PhD or the specified core courses for the Engineering Physics PhD. Of the 30 hours for the Astrophysics PhD, 15 must be the specified core courses for the Astrophysics PhD.
 - C. Courses may be taken from other departments if they are listed with a G before the course number
 - D. No more than 12 credit hours can be below the 5000 level.
 - E. The Advisory Committee may ultimately allow substitutions of equivalent courses. Up to 44 hours of previous graduate work can be transferred at the request of the Advisory Committee.
- II. Complete 54 additional course and research hours.
- III. Pass the Physics PhD Qualifying Exams for the Physics PhD and pass the Astrophysics Qualifying Exams for the Astrophysics PhD.

- IV. Select research advisor & four other members for an Advisory Committee.
- V. Have an advisory conference at which the *Report of the Advisory Conference* is completed; submit the report to the Graduate College. [It is recommended that](#) this Advisory Conference and the associated program of study be completed during the second year. It is not necessary to have passed all parts of the Qualifier to assemble the committee and have this advisory meeting.
- VI. Pass the PhD General Examination for admission to candidacy.
- VII. Complete research for PhD dissertation and write dissertation, with approval by advisor.
- VIII. Review *Information for Candidate for the Doctoral Degree* packet from Graduate College.
- IX. Submit reading copies of dissertation the Doctoral Committee members at least four weeks before the defense.
- X. At least 10 working days in advance of the final oral examination and at least 4 weeks before the last day of final exams, submit the *Request for Authority to Defend form* to the Graduate College so that it can be approved by the Graduate College and issued to the student and the Doctoral Committee chair.
- XI. Obtain the *Authority Report Form* from the Graduate College
- XII. Pass the final oral defense of the dissertation.

APPENDIX C

SUGGESTED SEQUENCE FOR COURSES FOR THE PHYSICS PHD

For the student's information, we present the following suggested sequence. This is intended as a guide to completing the 36 hours of course requirements for the PhD in the first four semesters. This path is one standard sequence of coursework designed to prepare the student to pass the written Qualifying Exam as early as possible in the student's career. Other sequences may be followed in consultation with the Graduate Advisor.

PhD (Physics)

Sample Path, Physics	
August Qualifiers	Free attempts on any exam.
Fall semester of first year	PHYS 5000: Introduction to Graduate Studies PHYS 5013: Math Methods PHYS 5153 Classical Mechanics PHYS 5393 Quantum Mechanics I
January Qualifiers	Free attempt on any exam not yet taken.
Spring Semester	PHYS 5163 Statistical Mechanics PHYS 5403 Quantum Mechanics II

	PHYS 5573 Electrodynamics I
August Qualifiers	Required to take any two qualifying exams
Fall Semester of second year	PHYS 5583 Electrodynamics II Graduate elective Graduate elective
January Qualifiers	Required to take any one qualifying exams
Spring semester	Graduate elective Graduate elective Graduate elective
August Qualifiers	Must have attempted all exams once
After completing qualifying exams	To get a Master's degree based on the Qualifying Exam or the General Exam a petition to the graduate college with a Program of Study form must be made one semester before taking a non-thesis examination with the Advisory Committee confirming mastery of Qualifying Exam physics..
Fall & Spring semesters of third year	Student must complete General Exam for candidacy by the end of the first semester of their fourth year.

Physics (Astronomy) PhD

Sample Path, Astrophysics	
August Qualifiers	Free attempts on any exam.
Fall semester of first year	PHYS 5001: Introduction to Graduate Studies PHYS 5013: Math Methods PHYS 5153 Classical Mechanics ASTR 4303 Stellar Astrophysics or other ASTR course
January Qualifiers	Free attempt on any exam not yet taken.
Spring Semester of first year	PHYS 5163 Statistical Mechanics PHYS 5573 Electrodynamics I ASTR graduate elective
August Qualifiers	Required to take two qualifying exams
Fall Semester of second year	PHYS 5583 Electrodynamics II PHYS 5393 Quantum Mechanics I ASTR Graduate elective
January Qualifiers	Required to take any one qualifying exam
Spring semester of second year	PHYS 5403 Quantum Mechanics II ASTR Graduate elective ASTR Graduate elective
August Qualifier	Must have attempted all exams once (including Astrophysics Exam).

Fall & Spring semesters of third year	Students must complete General Exam for candidacy by the end of the first semester of their fourth year.
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APPENDIX D

SUGGESTED SEQUENCE FOR COURSES FOR THE ASTROPHYSICS PHD

For the student's information, we present the following suggested sequence. This is intended as a guide to completing the 36 hours of course requirements for the PhD in the first four semesters. This path is one standard sequence of coursework designed to prepare the student to pass the written Qualifying Exam as early as possible in the student's career. Other sequences may be followed in consultation with the Graduate Advisor.

PhD (Astrophysics)

Sample Path, Physics	
August Qualifiers	Free attempts on Astrophysics qualifier.
Fall semester of first year	PHYS 5000: Introduction to Graduate Studies PHYS 5013: Math Methods PHYS 5153 Classical Mechanics ASTR 4303 Stellar Astrophysics
January Qualifiers	Free attempts on Astrophysics qualifier if not taken in August

Spring Semester	PHYS 5163 Statistical Mechanics PHYS 5573 Electrodynamics I ASTR Graduate Elective
August Qualifiers	Required to take Astrophysics qualifier if not passes
Fall Semester of second year	PHYS 5393 Quantum Mechanics 1 ASTR Graduate elective PHYS 5990 Special Studies
Spring semester	ASTR Graduate elective ASTR Graduate elective PHYS 5990 Special Studies
Fall & Spring semesters of third year	ASTR Graduate elective PHYS 5990 Special Studies
Spring semesters of third year	Student must complete General Exam for candidacy by the end of the second semester of their third year.

APPENDIX E

SCHEDULE OF ADVANCED TOPICS COURSES IN PHYSICS

Fall	Spring
PHYS 5213 Nuclear and Particle	PHYS 5243 Solid State Physics
	PHYS 5813 Atomic and Molecular Physics
	PHYS 6433 Quantum Field Theory

Courses offered intermittently based on student demand	
PHYS 5223 Optics	PHYS 6213 Advanced Particle Physics
PHYS 6243 Advanced Solid State Physics	PHYS 6283 Advanced Atomic and Molecular Physics
PHYS 6333 General Relativity	PHYS 6810 Collision Dynamics
PHYS 6443 Advanced Quantum Field Theory	PHYS 6860 Advanced Math Methods

The schedule shifts due to faculty commitment and student interest.

SCHEDULE OF ADVANCED TOPICS COURSES IN ASTRONOMY

Courses offered intermittently based on student demand	
ASTR 5900 Numerical Methods	ASTR 5900 ExtraGalactic
ASTR 5900 Solar System	ASTR 5900 Advanced Cosmology
ASTR 5900 Compact Objects	ASTR 5900 Machine Learning
ASTR 5900 AGN	ASTR 5900 Planetary Astro
ASTR 5900 Time Domain Astronomy	ASTR 5900 Scientific Writing

The schedule shifts due to faculty commitment and student interest.

As interest and resources permit, the GSC will consider additions to this list of advanced courses, such as seminar courses in specialized topics. Students in condensed matter physics may wish to choose advanced courses in Electrical Engineering (e.g. ECE 5303 Solid State Devices, or CH E 5183 Graduate Transport Phenomena).

One-hour seminars in each of the research areas are offered every semester.

APPENDIX G

English Proficiency Exams

To have any teaching contact with students, it is a university requirement that international students be certified by the English Assessment Program in the Graduate College. There are four levels of certification: NC (no contact), C, B, and A. Level C students can only serve as graders. Level B can teach labs and discussion section under the supervision of a faculty member. Level A can be full TAs, and can teach free-standing courses, for example, in the summer. For information on how to get certified in English proficiency, contact the ETCS office at <https://www.ou.edu/gradcollege/current-students/etcs>, which gives examinations and English courses throughout the year. It is the policy of the department to encourage students to seek the highest level of English certification possible. Not only will that allow students to serve as independent teachers, but such proficiency will be extremely useful throughout a future career.